

## **Abstract:**

### **Title of the study: Assessment of the effect of medical education on the functional connectivity of the brain using resting state fMRI**

Name of the candidate: Sheena Prineethi G

Department: Radiodiagnosis

Degree and subject: M.D. Radiodiagnosis

Guide: Dr. Sunithi Mani

**Background:** The brain is a very complex organ and the seat of many important functions, hence much effort and research has gone into understanding how the brain functions and coordinates various activities. Of the various aspects which can affect the brain networks, there have been few studies which show that education had a significant effect on various networks of the brain involved in memory, intelligence and learning. Through these studies we learn more about the networks which are involved in the process of memory, learning etc and in turn apply this knowledge into the deeper understanding of various cognitive disorders. In this study we aimed to show the affect of medical education on the functional networks of the brain.

**Objective:** To determine the differences in the functional networks of the brain in a group of individuals who completed four and half years of medical training as compared to a group of individuals with no medical training and to map out the regions of interest where these differences were significant

**Methods:** Resting state fMRI was performed in 3 Tesla Philips MRI scanner on two groups of medical students, first group consisting of 22 individuals who completed four and half years of medical training in CMC, Vellore and the second group consisting of 26 individuals who newly joined the medical course in CMC. The fMRI data was pre processed using SPM8 software and seed-to-voxel based analysis was done using CONN version 16.L implemented in SPM8.

**Results:** There were significant differences in the right inferior temporal gyrus (MNI coordinates, 50, -6, -38), right supplementary motor cortex (MNI coordinates, -6, -7, -61) and left cerebellum (MNI coordinates, -46, -52, -40) of the final year brain connectivity as compared to the first years. The above mentioned regions showed increased connectivity and interactions with different regions in the fronto-parietal lobes and the cerebellum.

**Conclusions:** Significant increased brain connectivity in the group which completed four and half years of medical training was seen in the temporal lobe, which is known to be the seat of long term memory and recall, the cerebellum, which is the seat of language and motor coordination and the supplementary motor cortex which is responsible for fine motor movements and the ability to initiate a motor function.

**Key words:** Resting state functional MRI, medical education, brain networks, functional connectivity